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ORIGINAL ARTICLE

Nonligation of indirect hernia sac in senior male patients with dilated internal ring

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Summary *Background:* There is a debate about how the indirect hernia sac should be treated in order to prevent hernia recurrence. Recently, nonligation treatment of the indirect hernia sac has been proposed and performed successfully in patients with nondilation of the internal ring.
Aims: To evaluate the feasibility of nonligation of the indirect hernia sac among patients with a dilated internal ring.
Materials and methods: Data were gathered from January 2005 to August 2008. Patients from two regional hospitals included 117 senior male patients with indirect inguinal hernia and medium or large internal ring orifices. The patients were divided into two groups: a ligation group and a nonligation group. Simultaneous posterior wall reinforcement with Shouldice repair was performed on both groups.
Results: In the ligation group, high-ligation of the indirect hernia sac was performed in 60 patients with 62 hernia repairs. In the nonligation group, nonligation treatment of the hernia sac was performed in 57 patients with 60 hernia repairs. The postoperative pain intensity ($p = 0.730$) and complication rate ($p = 0.560$) were similar between the two groups. After a 3-year follow up period, six patients (10%) in the ligation group and eight patients (14%) in the nonligation group were lost to follow-up. The recurrence rate of indirect hernia was similar in both groups ($p = 0.893$).
Conclusion: In senior male patients with a dilated internal ring, nonligation treatment of the indirect hernia sac is a safe procedure with no adverse influence on indirect hernia recurrence if a simultaneous posterior wall repair is performed.

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1. Introduction

Indirect hernia sac high ligation is a time-honored surgical concept in the treatment of indirect inguinal hernia.[1] Since 1978, however, nonligation treatment of the hernia sac has been proposed by several authors,[2,3] without increasing indirect hernia recurrence. It has been shown that the peritoneum heals rapidly with a newly formed fibrotic tissue after a nonligation procedure.[4] The procedure is safe in pediatric and young patients with nondilation of the internal rings.[5,6] Male sex and age are significant risk factors for recurrent inguinal hernia disease,[7] therefore, we decided to conduct this serial, prospective study to evaluate the efficiency and safety of nonligation of indirect hernia sac in senior male patients with dilated internal rings, defined as medium or large internal rings.[8,9]

2. Materials and methods

From two regional hospitals, 117 consecutive male patients ranging from 54 years to 83 years in age, with indirect inguinal hernia and a distorted enlarged internal ring orifice were collected for this study from January 2005 to August 2008. The sizes of the internal ring orifices varied from medium (1.5—3 cm) to large (>3 cm).[8,9] These 117 consecutive patients were divided into the ligation and nonligation groups. Patients from both groups were matched according to types of inguinal hernia (Table 1). A group of 15 patients with sliding hernia were grouped into the nonligation group as indirect hernia. Hernia surgery was performed under spinal or general anesthesia. In the ligation group, there were 62 hernia repairs in 60 patients. The indirect hernia sacs were ligated at the neck of the hernia sac prior to excision or division. Reinforcement of the posterior wall of the inguinal canal was performed using the Shouldice technique.[10] In the nonligation group, there were 60 hernia repairs in 57 patients. The hernia sacs were inverted totally with smooth forceps into the preperitoneal space without resection in 21 hernia repairs. Another 24 hernia sacs in the nonligation group were amputated and the proximal stump of the hernia sac was closed, leaving the distal part in place, without ligation at its neck prior to reduction of the hernial sac into the preperitoneal space. In 15 sliding hernia repairs, high ligation of the hernial sac was not attempted, but the herniated sac was reperitonized or dissected gently and reduced into the preperitoneal space.[11] All patients in the nonligation group also underwent a simultaneous Shouldice repair for the posterior wall reconstruction. The operative times, the postoperative complications including wound infection, hematoma, erythema, seroma, or retention of urine, were collected and analyzed. The intensity of pain was graded with a verbal pain scale as very mild, discomforting, tolerable, distressing, and very distressing at the first week outpatient visit.[12] Statistical analyses were performed using the Pearson χ^2 test. Follow-up was carried out at 1 week, 2 weeks, 1 year, and 3 years at the outpatient clinic or by telephone interview.

Table 1 Types of hernia and sizes of internal ring orifices.

	Ligation group[a] (n = 62)	Nonligation group[b] (n = 60)
Type of hernia		
Indirect	62 (100)	60 (100)
Pantaloon	14 (22.5)	12 (20)
Bilateral	2 (3)	3 (5)
Size of internal ring		
Medium	41 (66)	37 (62)
Large	21 (34)	23 (38)

Data are presented as n(%).
[a] Ligation group: 62 hernia repairs in 60 patients.
[b] Nonligation group: 60 hernia repairs in 57 patients.

3. Results

The ligation and nonligation groups were well matched for sizes of internal ring orifices (p = 0.707; Table 1) and incidence of coexisting Pantaloon hernia (p = 0.826). The range of operation times was 65—146 minutes in the ligation group and 72—164 minutes in the nonligation group. The average operation time was 94 minutes in the ligation group and 98 minutes in the nonligation group. The grading of pain intensity, (p = 0.730; Table 2) and postoperative complication rate (p = 0.560; Table 3) were similar in both groups. Three years after surgery, follow-up data were available for 54 patients (90%) in the ligation group and 49 patients (86%) in the nonligation group, and no indirect hernia recurrence was detected in either group.

4. Discussion

There is no consensus on how the indirect hernia sac should be treated in order to prevent recurrence of inguinal hernia.[1] Ferguson was the first to question the value of high ligation of indirect hernia sac.[2] However, Wantz and Fisher have stressed the importance of high ligation in inguinal hernia repair to reduce hernia recurrence.[13] Their analysis of 584 operations for recurrent inguinal hernia also showed failure to perform high ligation of the indirect sac was the cardinal cause of recurrence.[14]

Based on the experience of nonligation of indirect hernia sac in the sliding hernia treatment, we found that the indirect hernia sac ligation was not an essential procedure in hernia treatment. Also, we usually do not perform high ligation and division of the hernia sac in the treatment of ventral hernia, lumbar hernia, or any other types of abdominal wall hernia. The repair of the fascia is more crucial to ensure a successful outcome of hernia repair than the management of the hernia sac. Why did the ligation of

Table 2 Pain scale at first week follow-up postoperatively.

Grade	Ligation group (n = 60)	%	Nonligation group (n = 57)	%
Discomforting	9	15	11	19
Tolerable	45	75	39	68
Distressing	6	10	7	12

Table 3 Postoperative complications.

Complication	Ligation group ($n = 60$)	%	Nonligation group ($n = 57$)	%
Urinary retention[a]	5	8.3	6	10.5
Seroma	3	5	3	5.2
Hematoma	1	1.6	2	3.5
Scrotal swelling	2	3.3	3	5.2

[a] Urinary retention: retained urinary catheter for >2 days.

the hernia sac remain a "must" in reducing inguinal hernia recurrence?[14] This might be due to the diversity of groin hernia severity and different operative techniques used in these series.

Casten[5] was the first to introduce in 1967 the concept of a nondilated internal ring with small indirect hernia (Type I) versus a dilated internal ring with larger indirect hernia (Type II) that was presumed to function poorly. For a good stratification of disease severity, we have to evaluate separately the necessity of indirect hernia sac ligation in patients with a nondilated internal ring and in patients with a dilated internal ring. Thus a reasonable comparison can be achieved and the result can be fairly evaluated. For this purpose, senior male inguinal hernia patients, who had a characteristic high incidence of medium and large indirect inguinal hernias, were selected for this study. For a good comparison, we performed a Shouldice repair for all patients in this study, in order to eradicate any possibly unidentified direct hernias on the posterior wall of the inguinal canal. Thus, we had two well-matched groups of patients with a dilated internal ring for evaluating the necessity of hernia sac ligation for the prevention of indirect hernia recurrence.

The efficiency of the hernia treatment was evaluated first using the rate of recurrence and operative complications.[15] The results of our series showed no recurrence in either group after 3 years of follow-up. We may conclude from this serial, prospective but not randomized study that a similar degree of efficacy was achieved in both the ligation and nonligation groups, with concomitant reinforcement of the posterior wall of the inguinal canal. We also observed that a higher dissection area had to be made around the neck of the herniated sac in the nonligation group in order to reduce the sac freely. Subsequently, this procedure allowed more lateralization of the cord and provided better exposure of the internal ring edge to facilitate repair of the posterior wall of the inguinal canal.[1] There was also no chance of leaving a stump of the peritoneal sac after nonligation hernia sac reduction, which was frequently found in the ligation group. Could this factor contribute to a better result in a longer follow-up period? Statistical data from a 4-year follow-up study failed to show any influence on the relative risk of reoperation due to recurrence among patients who underwent nonligation or ligation treatment of the indirect hernia sac with simultaneous Shouldice repair.[16] We would expect a better result after a longer follow-up period using this deeply anatomical dissection in the nonligation treatment group.

In some series, high ligation of the hernia sac was proposed as a time-consuming procedure[17] and was associated with higher postoperative pain intensity.[18,19] In our series, there was no significant difference in pain intensity, and the rate of postoperative complications was the same between the ligation and nonligation groups, because we did simultaneous posterior wall repair in all patients. There was a slightly longer average operation time in the nonligation group because of the time-consuming procedures for the 15 complicated sliding hernia repairs in this group.

In conclusion, in senior male patients with a dilated internal ring, nonligation treatment of the indirect hernia sac with concomitant posterior wall repair is a safe procedure. High ligation of the indirect hernia sac has no determinant role in preventing early indirect hernia recurrence.

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